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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,735	09/23/2003	Ronald D. Provow	58727US002	1778
32692	7590	03/02/2006		EXAMINER
3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			MARCHESCI, MICHAEL A	
			ART UNIT	PAPER NUMBER
			1755	

DATE MAILED: 03/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/668,735	PROVOW ET AL.
	Examiner	Art Unit
	Michael A. Marcheschi	1755

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 10 November 2005.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1,2,4-10,12,14-26,28 and 30-38 is/are pending in the application.
- 4a) Of the above claim(s) 6-9 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1,2,4,5,10,12,14-26,28 and 30-38 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 10 November 2005 is/are: a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/10/05 has been entered.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 5, 10, 12, 14-24, 26, 28 and 30-38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 is indefinite because the limitation “the planar top **section**” lacks antecedent basis since a top “**section**” has not been literally defined before.

After further review, claim 10 is indefinite because the examiner is unclear as to what the undercut portion is relative to (between). Is it the undercut portion between the base and one of the surfaces? This should be clearly defined.

After further review, claim 18 is indefinite because the examiner is unclear as to what the rake angle is between. Is it between the base and sidewall? This should be clearly defined.

After further review, claim 21 is indefinite because the limitation “from the surface having a negative rake angle because a “surface having a negative rake angle” has not been defined before. In addition, what is the angle between (what defines the angle)? The limitation “having a negative rake angle” should be canceled.

After further review, claim 26 is indefinite because the examiner is unclear as to what the undercut portion is relative to (between). Is it the undercut portion between the base and one of the surfaces? This should be clearly defined.

After further review, claim 34 is indefinite because the examiner is unclear as to what the undercut portion is relative to (between). Is it the undercut portion between the base and one of the surfaces? This should be clearly defined.

After further review, claims 35-36 are indefinite because the limitation “said contacting **further includes**” implies a further step but the claims are only further define the abrasive composite. In addition the limitation “further includes contacting the abrasive article” does not define the claims in a clear and concise manner. In view of this, the claims should be rewritten (i.e. wherein the abrasive composites further include...).

After further review, claim 36 is also indefinite as to the limitation “adjacent the base on the undercut portion” since the examiner is unclear as to what this encompasses.

The other claims are indefinite because they depend on indefinite claims.

Claims 1, 2, 4, 5, 10, 12, 16-22, 25, 26, 28, 32-35 and 38 are rejected under 35

U.S.C. 103(a) as obvious over Hoopman (097) in view of Neff (099) and Adefris et al. (108) **alone or further** in view of Wei et al. (724).

The teachings according to Hoopman (097) and Neff (099) are defined in the previous office action.

Adefris et al. shows in figure 1 (last abrasive feature shown-feature closest to numeral 14) that composites for abrasive articles are known to define a positive rake angle with respect to the base (undercut section).

Wei et al. teaches in column 2, lines 44+ and column 5, lines 9-12 that the application of a functional powder (abrasive) to the surface of structured abrasive modifies the abrasive qualities (i.e. assists in the abrasive cut (removal of material from a work piece)).

The primary reference fails to teach (1) the positive rake angle (undercut) of the composites, (2) the abrasive particles on the surface of the planer top and (3) angled top surface. With respect to the rake angle (undercut), this limitation, however, is obvious to the skilled artisan because Neff et al. teaches that more aggressive rate removal applications require abrasive features (i.e. the cone according to the reference can broadly be considered an abrasive feature) with a positive rake angle to the base (i.e. the reference implies that a positive rake angle optimizes this application and provides a benefit of using a feature having a positive rake angle) and it is the examiners position that this would provide the necessary motivation to produce the shapes defined by the primary reference having a positive rake angle. One reading this secondary reference would understand that composites can be made with a positive rake angle (to the base) if the application desired was aggressive removal. In view of the above, clear

motivation for the combination is apparent. To further support the examiners position, Adefris et al. clearly shows that composites for abrasive articles are known to define a positive rake angle with respect to the base (undercut section). With respect to the angled surface (dependent claims 2, 5 and 21 and independent claims 10, 26 and 34), the primary reference states that the features can be any convenient shape and this broadly reads on features having an angled top portion. In addition, the reference states that the features can be a truncated pyramid and the broad interpretation of “truncated” encompasses an angled top, as long as said top is flat. With respect to the abrasive particles provided on the planer top portion of the features, this limitation is obvious because it is the examiners position that this limitation would have been obvious to the skilled artisan in order to assist in removing material from the work piece. To support the examiners position, Wei et al., as defined above, clearly shows that the application of a functional powder (abrasive) to the surface of structured abrasive modifies the abrasive qualities (i.e. assists in the abrasive cut (removal of material from a work piece)). Although this reference does not specifically state that the functional powder is applied to the planar surface of abrasive composites, one skilled in the art would have appreciated the concept of using a functional powder to be applied to any abrasive structure. With respect to the shape defined by claim 4 and the other claims corresponding to the same subject matter, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a point outside the base perimeter absent evidence to the contrary. With respect to claim 16, the arrangement of the features is well within the level of ordinary skill in order to maximize the abrasive performance. With respect to the undercut limitation, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake

angle has a undercut section absent evidence to the contrary. With respect to the belt limitation and abrading method, the primary reference defines these. The limitations not addressed above are taught or implied by the references.

Claims 1, 2, 4, 5, 10, 12, 16-22, 25, 26, 28, 32-35 and 38 are rejected under 35 U.S.C. 103(a) as obvious over Adefris et al. (108) in view of Hoopman (097) **alone or further** in view of Wei et al. (724).

Adefris et al. shows in figure 1 (last abrasive feature shown-feature closest to numeral 14) that composites for abrasive articles are known to define a positive rake angle with respect to the base (undercut section). The composites are attached to a backing (flexible-see column 4, line 56). The composites can be a truncated pyramid or a random shape (column 3, lines 57-59) and are made from an abrasive with a ceramic binder (see abstract).

The teachings of Wei et al. are defined above.

Although the primary reference uses a ceramic to bond the abrasives together, it is the examiners position that the use of a polymer in place of the ceramic would have been well within the level of ordinary skill in the art because Hoopman teaches that polymeric binders are known for this purpose. Since both ceramics and polymeric binder are known for the same purpose (bond abrasive together to form abrasive composites as clearly shown by both reference), they can be considered functional equivalent materials for forming abrasive composites and the substitution of one functional material for another that is to be used for the same purpose is clearly within the scope of the skilled artisan. With respect to the rake angle (undercut), Adefris et al. clearly shows that composites for abrasive articles are known to define a positive rake

angle with respect to the base (undercut section). With respect to the angled surface (dependent claims 2, 5 and 21 and independent claims 10, 26 and 34), the primary reference states that the features can be truncated pyramids and the broad interpretation of “truncated” encompasses an angled top, as long as said top is flat. With respect to the abrasive particles provided on the planer top portion of the features, the primary reference states that a size coating (one containing abrasive particles (silica)) can be applied to the composites (see column 11, line 30 and column 12, line 16), thus reading on this limitation. In the alternative, this limitation is obvious because it is the examiners position that this limitation would have been obvious to the skilled artisan in order to assist in removing material from the work piece. To support the examiners position, Wei et al., as defined above, clearly shows that the application of a functional powder (abrasive) to the surface of structured abrasive modifies the abrasive qualities (i.e. assists in the abrasive cut (removal of material from a work piece). Although this reference does not specifically state that the functional powder is applied to the planar surface of abrasive composites, one skilled in the art would have appreciated the concept of using a functional powder to be applied to any abrasive structure. With respect to the shape defined by claim 4 and the other claims corresponding to the same subject matter, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a point outside the base perimeter absent evidence to the contrary. With respect to claim 16, the arrangement of the features is well within the level of ordinary skill in order to maximize the abrasive performance. With respect to the undercut limitation, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a undercut section absent evidence to the contrary. With respect to the belt limitation, the primary

reference clearly discloses this (column 13, line 50). With respect to abrading a wood work piece, although not literally defined by the primary reference, this aspect is well within the scope of the skilled artisan because Hoopman teaches that wood work pieces are known to be abraded with abrasive articles. The limitations not addressed above are taught or implied by the references.

Claims 1, 2, 4, 5, 10, 12, 16-22, 25, 26, 28 and 32-33 are rejected under 35 U.S.C. 103(a) as obvious over Kaisaki et al. (317) **alone or further** in view of Wei et al. (724).

Kaisaki et al. teaches in column 5, lines 28-35, column 6, lines 59-68, column 16, lines 35 and 43-60, column 19, lines 51+, column 24, lines 32-46 and column 25, line 46, an abrasive article (belt) comprising a flexible backing and abrasive features thereon, wherein said abrasive features comprise abrasive particles and a polymeric binder. The abrasive features are set forth to have a positive, negative or zero taper. The abrasive features can be any shape (i.e. truncated pyramid).

The primary reference fails to literally define a positive rake angle (undercut). The reference, however, teaches that the abrasive features are set forth to have a positive or negative taper and it is the examiners position that the teaching of this broadly makes obvious the claimed rake angle and undercut absent evidence to the contrary. With respect to the angled surface (dependent claims 2, 5 and 21 and independent claims 10 and 34), the primary reference states that the features can be any convenient shape and this broadly reads on features having an angled top portion. In addition, the reference states that the features can be a truncated pyramid and the broad interpretation of “truncated” encompasses an angled top, as long as said top is flat. With

respect to the abrasive particles provided on the planer top portion of the features, this limitation is obvious because it is the examiners position that this limitation would have been obvious to the skilled artisan in order to assist in removing material from the work piece. To support the examiners position, Wei et al., as defined above, clearly shows that the application of a functional powder (abrasive) to the surface of structured abrasive modifies the abrasive qualities (i.e. assists in the abrasive cut (removal of material from a work piece). Although this reference does not specifically state that the functional powder is applied to the planar surface of abrasive composites, one skilled in the art would have appreciated the concept of using a functional powder to be applied to any abrasive structure. With respect to the shape defined by claim 4 and the other claims corresponding to the same subject matter, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a point outside the base perimeter absent evidence to the contrary. With respect to claim 16, the arrangement of the features is well within the level of ordinary skill in order to maximize the abrasive performance. In addition, the primary reference states that the features are defined in a predetermined pattern. With respect to the undercut limitation, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a undercut section absent evidence to the contrary. With respect to the belt limitation, the primary reference defines these. The limitations not addressed above are taught or implied by the references.

Claims 34-35 and 38 are rejected under 35 U.S.C. 103(a) as obvious over Kaisaki et al. (317) in view of Hoopman (097) **alone or further** in view of Wei et al. (724).

With respect to the shape of the abrasive feature, this is defined in the previous rejection, the examiners statements which are incorporated herein by reference. With respect to abrading a wood work piece, although not literally defined by the primary reference, this aspect is well within the scope of the skilled artisan because Hoopman teaches that wood work pieces are known to be abraded with abrasive articles.

Claims 18, 19 and 21-22 are rejected under 35 U.S.C. 102(e) as anticipated by Oliver (196).

Oliver et al. teaches in column 3, line 57-column 4, line 5, column 6, lines 38-40 and lines 46-55, figure 2 and claim 9+, an abrasive feature (pyramid-this has four sidewalls)) comprising abrasive particles surrounded by a setting matrix and a flexible binder (resin). The feature defines a positive rake face. As can be seen from figure 2, the top portion is angled.

The claimed invention is anticipated by the reference because the reference teaches an abrasive feature which comprises all of the claimed limitations. The examiner acknowledges that the flexible binder might be removed at a latter stage to make the final product, however, the intermediate feature disclosed clearly reads on the claimed feature.

Applicant's arguments with respect to all the claims have been considered but are moot in view of the new ground(s) of rejection. Although new rejections have been made, the examiner will comment on applicants remarks as they pertains to any of the rejections above.

Notwithstanding applicants remarks, the rejection based on Bruxvoort has been withdrawn because this reference does not teach abrasive particles in the microstructures (i.e. microstructure are defined as having undercut sides).

The rejections based on Neff, as the **primary reference**, are withdrawn in view of applicants arguments.

However, applicants arguments based on Hoopman (097), as the primary reference, in view of Neff (099) are not clearly defined. It appears that applicants arguments are substantially focused on Neff as the primary reference. It would appear that any argument based on the above combination is that abrasive articles (Hoopman) are not analogous to cutting tools (Neff) because abrasive articles are generally referred to coated abrasive articles. The examiner acknowledges that the claims, as amended, imply coated abrasives (abrasive features on a backing), but the examiner is merely using the teachings of Neff to show the concept of using a positive rake angle in abrasive tools (i.e. this is what Neff is broadly directed to-see the claim). The motivation to use this concept is the aggressive removal rate, irrespective of the form of the abrasive tool (abrasive article or cutting tool) . In addition, a cutting tool (saw) is an abrasive article and thus they are analogous because they both are related to abrasive articles. However, to further clarify the examiners position, a new reference has been applied in conjunction with Neff. Applicants agree that a positive rake angle is used for aggressive removal applications, however, they state that this is for a single point tool and not for a plurality of abrasive features. Are applicants stating that this aggressive removal (by use of a positive rake angle) is only applicable to single point tools? Applicants also make a statement on page 19, lines 17-24 of the response. The examiner has not made a statement that the flat angled top is obvious to assist in removal of

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material but rather that the use of abrasive particles would have been obvious for this reasons.

This is clear because the examiner refers to claim 3 and claim 3 defines that abrasive particles are present on the surface of the abrasive features.

Claims 14, 15, 23, 24, 30, 31, 36 and 37 would be allowable if amended to include the limitations of the base claim and any intervening claim, as well as, amended to overcome any indefinite rejection applied.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Marcheschi whose telephone number is (571) 272-1374. The examiner can normally be reached on M-F (8:00-5:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MM
2/06

Michael A. Marcheschi
Primary Examiner
Art Unit 1755